

THE MODEL OF CRIMINAL ACTIVITY AND EFFECTIVE CARTEL DETERRENCE¹

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Abstract. *Cartels, or secret agreements between competitors, are universally recognized as the most harmful of all types of anticompetitive conduct. Facing the challenges associated with globalization of the market economy, competition authorities in all parts of the world are increasing their efforts to design and implement modern instruments, effective enforcement procedures and adequate sanctions in order not only to detect and punish, but also to deter cartels.*

In this paper, we analyze the deterrent properties of the competition policy within the legal framework of the European Union. Applying the classical deterrence theory based on the model of criminal activity, we identify two key factors that affect the degree of deterrence of anticompetitive behavior: adequate sanctions and the probability of detection. We further discuss the level of fines, leniency programs and direct settlement procedures, both the latter as instruments to enhance the probability of cartel detection.

By employing the methods of meta-analysis and meta-synthesis of economic and legal literature, cartel case studies, and descriptive statistical analysis, our attempt is to show that during the past decades the European competition authorities have focused on efforts to increase the effectiveness of cartel prosecution and to achieve better deterrence by numerous alterations in the European competition law, such as extensions of the fine spectrum or leniency programs or introduction of a direct settlement procedure, and that these efforts have proven to be rather successful for preventing the formation of anticompetitive agreements.

Key words: *competition policy, cartels, deterrence, leniency, fines*

Introduction

Cartels, or illegal agreements between competitors, are designed to limit or eliminate competition between them, with the objective of increasing prices and profits of the participating companies, and have long been a problem for market economies. In modern economy, secret cartel agreements are considered as a direct assault on the principles of competition and universally recognized as the most harmful of all types of anticompetitive conduct. Economic literature on cartels provides substantial arguments that cartels cause economic

¹ An abridged version of this paper was originally submitted to the conference “Economic Transformations and Business Prospects” at Vilnius University in September 2013. In the present version, in order to reveal the factors that have an impact on the deterrence of cartel behavior, we focus on a standard model of criminal activity. Statistical data have been updated as well.

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harm, because they raise prices, reduce output and may stunt incentives to innovate.² In practice, this is generally done by fixing prices, limiting output, sharing markets, allocating customers or territories, bid rigging or a combination of these specific types of restriction.

The damage caused by cartels to the economy and consumer welfare is substantial³. Considering the harmful effects of cartels on society and economy, competition authorities in all parts of the world attach great importance to the detection and deterrence of cartels in order to promote competition and develop a healthy economy. Without exception, the legal systems of the Member States of the European Communities include rules prohibiting collusive agreements among competitors. It is also generally accepted that the rules prohibiting cartels should be accompanied by effective enforcement powers and sanctions in order not only to detect and punish, but, what is even more important, to reduce incentives for infringement. Indeed, a successful cartel policy is above all the one which discourages cartels, as well as effectively fights the ones that nonetheless come into being (Motta, 2007). Economic analysis plays a role in assessing whether the current system of enforcing powers and sanctions is designed as such that can most effectively deter the collusive behavior. Nevertheless, despite considerable efforts and an impressive progress in fighting cartels by the competition authorities during the past decades, the effectiveness of the current enforcement system is increasingly discussed in the economic literature with respect to improving cartel deterrence through enhanced detection and new sanctioning regimes against offenders.

The aim of the paper is to review recent studies on the deterrent properties of the competition policy and to reveal the main factors of antitrust regime that determine the degree of deterrence of anticompetitive practices by applying the classical deterrence theory based on the model of criminal activity. Additionally, paying special attention to antitrust practices within the legal framework of the European Union, we seek to examine the current system of enforcement powers and sanctions regarding its ability to effectively deter the collusive behavior.

The methods employed are the meta-analysis and meta-synthesis of the economic and legal literature, cartel case studies, and descriptive statistical analysis.

The model of criminal activity

Deterrence is a central theme in the theory and practice of law enforcement, and the enforcement of competition law is no exception.⁴ The deterrent effect of crime prevention results in a decrease in the level of criminal activity by making it a less attractive

² See, for example, the overview of economic literature on cartels in Damgaard et al. (2011).

³ More on economics of cartels and their harm caused on economy and consumer welfare, read in Klimašauskienė, Giedraitis (2011).

⁴ See Buccrossi et al. (2009) for a discussion on the issue of how competition law enforcement can deter anti-competitive behaviors.

behavioral choice.⁵ Deterrence of unlawful behavior may take different forms; the most relevant ones are *general deterrence* and *specific deterrence*. General deterrence, or *ex-ante* deterrence, focuses on the general prevention of crime by threatening violators with sufficiently heavy sanctions. The aim of specific, or *ex-post*, deterrence is to discourage the criminal from future criminal acts by instilling the understanding of the consequences. General deterrence is typically the primary objective of law enforcement, as it can be achieved for a very large number of potential infringements without the need for these to be detected by law enforcers (Buccirossi et al., 2009).

In order to reveal the factors that have an impact on the deterrence of cartel behavior, and to evaluate their effectiveness, we use a standard model of criminal activity based on the assumption that potential criminals are rational and seek to maximize their utility choosing either to commit a crime or engage in legitimate activity, expecting benefit as an income from each alternative. To explain how people behave in relation to incentive structures created by law, the Noble Prize Laureate Gary Becker provides a simple model according to which the expected costs for the offender should outweigh the potential benefits (Becker, 1968). The model has been further developed by numerous economists, among others Stigler (1970), Ehrlich (1973, 1981), Flinn (1986), Freeman (1999), and Sickles and Williams (2008). According to this model, whether firms choose to break the law depends on the associated costs of establishing and maintaining restrictive practices and on the severity of punishment if caught by violating existing competition laws as well as of the possibility of being caught.

The standard model is presented here using the notation of Freeman (1999) adopted by Damgaard et al. (2011). Let's denote:

- $WC \equiv$ expected payoff from criminal activity;
- $WL \equiv$ expected payoff from legitimate activity;
- $P \equiv$ probability of being convicted;
- $S \equiv$ severity of punishment;
- $U \equiv$ utility function.

It is assumed that a person who chooses not to commit a crime receives the payoff from legitimate activity of WL and associated utility $U(WL)$. A person who chooses to commit a crime receives a payoff WC if not punished and a payoff $WC-S$ if punished. Criminal activity thus yields the expected utility $EU = (1-P)*U(WC) + P*U(WC - S)$. Accordingly, a person chooses to commit a crime if the expected utility associated with criminal activity is greater than the utility associated with legitimate activity, i.e.

$$(1-P)*U(WC) + P*U(WC - S) \geq U(WL).$$

⁵ See Becker (1968) or Freeman (1999) for a proof of the expected sign of the effects.

Applying the standard model of criminal activity to cartel behavior, the economic theory of crime indicates that individuals and companies will be motivated to participate in cartel activity if the expected gain in terms of higher profits is greater than the expected costs associated with the probability of detection and subsequent punishment (Damgaard et al., 2011). According to Motta (2007), for deterrence to take place, it is necessary that a firm perceives that its expected net gain from taking part in a cartel, $\Delta\pi$, is lower than its expected cost which equals the probability that the cartel is being uncovered (and successfully prosecuted), p times the fine F the firm would receive if that case realizes. In formal terms, a firm will not take part in a cartel if the condition $\Delta\pi < pF$ holds. Therefore, the competition law and policy can make cartel activity less attractive by setting the probability of detection and the level of fines such that expected cost associated with cartel activity is greater than the expected gain.

The empirical evidence confirms also the positive deterrent effect of the probability of conviction (Nagin, 1998) and of the severity of fines and other sanctions (von Hirsch et al., 1999). The analysis of the deterrent effect of cartel sanctions, in particular, shows that the risk of sanctions simultaneously deters cartel activity and reduces the harm from existing cartels. For example, the introduction of antitrust laws in the UK led to cancellation of anti-competitive agreements, and empirical evidence from the US has suggested that there may be positive spillovers as the removal of cartels in one industry led to lower prices in similar industries (Davies, Majumdar, 2002). A survey by the Office of Fair Trading (OFT) in the UK of legal professionals suggested that approximately five anti-competitive activities were deterred for each detected activity, and a survey of company professionals found even higher deterrence ratios (Office of Fair Trading, 2007); two different OFT studies have shown that the fear of reputation damage, financial penalties and individual sanctions (such as director disqualification and criminal sanctions) are important deterrents of the anti-competitive behavior (Office of Fair Trading (2007) and (2010); another study has shown, specifically, that price-fixing infringement is more effectively deterred when imprisonment is incorporated as part of the penalty regime (Gallo et al., 2000).

In this paper, we firstly examine the sources of potential benefits for cartel members and then focus on the three main factors in an antitrust regime with optimal deterrence: on leniency programs and the direct settlement procedure both as instruments to promote the probability of cartel detection, and on the level of fines.

Cartel overcharges

The expected payoff from criminal activity (as in Freeman's model) or the expected net gain from taking part in a cartel (as in Motta's version) are mostly associated with the overcharges that cartels impose on consumers. The overcharges are defined as the difference between the collusion price and an artificial competitive benchmark price and

capture the mark-up for purchasers due to cartelization; it is typically expressed as a percentage of the counterfactual price. The price overcharge transfers income from consumers towards cartel members and thereby is considered as the most obvious harm caused by cartels to the economy and consumer welfare, which essentially determines the size of the deadweight loss. In 2008, the Commission of the European Communities made some general estimates of the harm to the economy caused by cartels. The Commission services looked at the 18 cartels which were the subject of the Commission decisions during the years 2005 to 2007, the size of the markets involved, the cartels' duration, and the very conservative assumptions regarding the estimated overcharge. Assuming an overcharge of between 5–15 percent, the harm suffered ranges from around EUR4 billion to EUR11 billion for these 18 cartels. Taking the middle point of this overcharge range – 10 percent – gives a conservative estimate of the consumer harm of EUR 7.6 billion due to these cartels. Even this figure is probably too low: the economic literature on the subject suggests that the average overcharge in prices can be as high as 20–25 percent (Report on Competition Policy, 2009). Empirical estimates of different studies on this subject are summarized in Table 1. Median overcharges range from 14% to 45% and average overcharges from 8% to 53%. The median values are generally lower than the average values because a few cartels result in very high overcharges.

TABLE 1. Review of private cartel overcharges

Study	No. of cartel cases examined	Overcharge (% of counterfactual price)	
		Median	Mean
Griffin (1989)	38	39	53
Cohen, Scheffmann (1989)	5-7	14	8-11
Posner (1976, 2001)	12	38	49
Levenstein, Suslow (2002)	22	45	43
Werden (2003)	13	18	21
OECD (2003)	13	14	22
Connor, Lande (2008)	374	25	49
Connor (2010)	1089	23	46
Smuda (2012)	191	18.37	20.70

Source: (Damgaard et al., 2011); (Smuda, 2012).

Fines

The current statistics of the European Commission demonstrates the growing fight against hard core cartels in order to increase the effectiveness of cartel prosecution and to improve the deterrent effect. Table 2 and Figure 1 show that there has been an impressive increase in the total fines imposed by the European Commission from the mid-90s and onwards.

TABLE 2. Fines imposed by the European Commission in cartel cases, 1990–2014

Period	Amount in €
1990–1994	344.282.550
1995–1999	270.963.500
2000–2004	3.157.348.710
2005–2009	8.182.251.662
2010–2014	8.416.555.579
Total	20.371.402.001

Source: calculated by the author using data from www.europa.eu.int/competition/cartels/statistics.

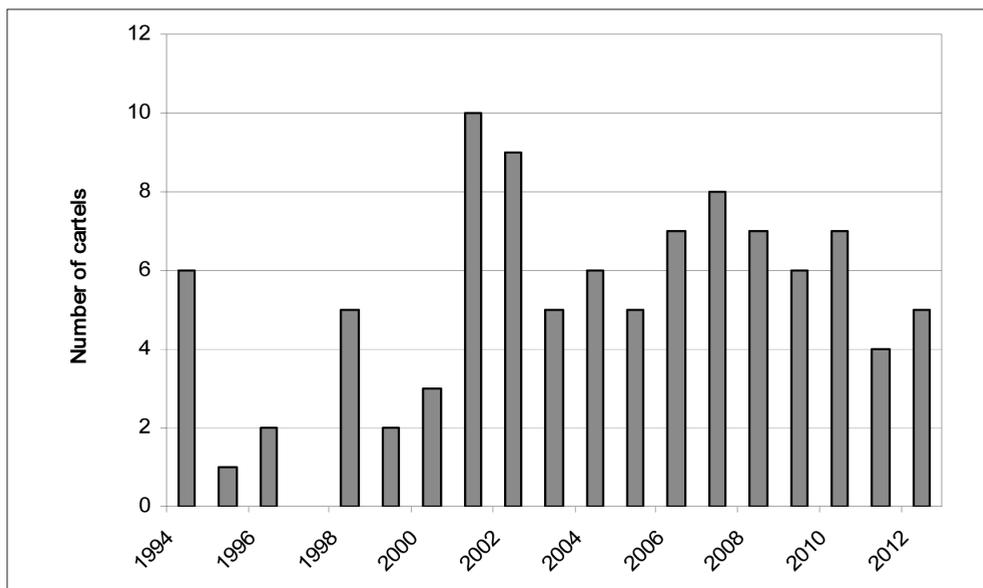


FIG. 1. Dynamics of fines imposed by the European Commission in cartel cases, 1990–2014

Source: created by the author using data from www.europa.eu.int/competition/cartels/statistics.

We can distinguish two leaps in the setting of fines, both induced by introducing the European Commission’s Guidelines on the method of setting fines, in 1998 and 2006. Compared to the period 1995–1999, in 2000–2004 the total amount of fines rose more than 11 times, and in 2005–2009, compared to the previous 5-year period, total fines increased 2.7 times. The 1998 Guidelines⁶ were adopted by the Commission in order to enhance transparency as to its fining policy. These Guidelines were revised in 2006 to further strengthen the Commission’s preventive and deterring approach⁷. The 2006 Penalty Guidelines stated (Point 4): *Fines should have a sufficiently deterrent effect, not only in order to sanction the*

⁶ Guidelines on the method of setting fines imposed pursuant to Article 15 (2) of Regulation No 17 and Article 65 (5) of the ECSC Treaty fines. Official Journal C 9, 14.01.1998, p. 3–5.

⁷ Guidelines on the method of setting fines imposed pursuant to Article 23 (2)(a) of Regulation No 1/2003. OJ C 210 2006 9 1, p. 2.

undertakings concerned (specific deterrence), but also in order to deter other undertakings from engaging in, or continuing, behavior that is contrary to Articles 81 and 82 of the EC Treaty (general deterrence). The accompanying Press Release (IP/06/857) added: *Fines are one of the means to ensure that companies do not engage in anticompetitive behavior. To that end, fines must be set at a level that ensures sufficient deterrence. This implies that fines should not only punish past behavior, but also that their level will deter that particular company, or any other, from entering into illegal behavior in the future.*⁸

The revised Guidelines included three main changes: the new entry fee, the link between the fine and the duration of the infringement, and the increase for repeat offenders. The Commission has the power to impose fines up to ten percent of an infringing firm’s prior year’s turnover. If the cartel’s infringement has relatively small effects, the amount of the fine may be reduced in accordance with the doctrine of proportionality. Conversely, aggravating factors may increase the fine. For example, firms that had long participated in a cartel and firms with previous antitrust violations are subject to a higher penalty.

The implementation of 2006 Penalty Guidelines not only increased the total amount of fines imposed by the Commission with respect to cartel infringements in recent years compared to the previous, but also resulted in a number of record fines imposed in separate cartel cases (Table 3).

TABLE 3. Ten highest cartel fines per case (since 1969)

Year	Case name	Amount (€)
2012	TV and computer monitor tubes	1.470.515.000
2008	Car glass	1.189.896.000
2013	Euro interest rate derivatives (EIRD)	1.042.749.000
2014	Automotive bearings	953.306.000
2007	Elevators and escalators	832.422.250
2010	Airfreight	799.445.000
2001	Vitamins	790.515.000
2008	Candle waxes	676.011.400
2007/2012	Gas insulated switchgear (incl. readoption)	675.445.000
2013	Yen interest rate derivatives (YIRD)	669.719.000

Source: www.europa.eu.int/competition/cartels/statistics.

The European Commission’s fines are designed to induce general and specific deterrence, and they have been set very high to achieve this goal. The question that many economists argue about is whether the level of current fines is sufficient to achieve the optimal deterrence. For example, Allain et al. (2011) estimate that the fine necessary for optimal deterrence is around 28% to 67% of annual sales depending on assumptions as to profit

⁸ Competition: Commission revises Guidelines for setting fines in antitrust cases. Press release: IP/06/857 28/06/2006.

margins and demand elasticity. In their opinion, for the 64 firms prosecuted over the period 1975 to 2009 for which data were available, 56% were fined at the levels that were sufficient or more than sufficient to satisfy the goal of optimal deterrence. However, others argue that the fines should be higher to achieve the optimal deterrence, considering the low detection rate. Given an estimated detection rate of around 15% or lower, this suggests that fines should probably be seven or more times greater than they have been (Veljanovski, 2012). A comparison between cartel overcharges and the existing fine level according to the current EU Guidelines, made by Smuda (2012), showed that in 67% of the cases the gain from price fixing outweighed the expected punishments, although the calculations were based on maximum values for cartel detection and upper limits of penalty levels. Connor and Lande (2007) compared the average amounts cartels gained from their illegal overcharges with the levels of fines imposed in the US and the EU. After finding that cartel overcharges ranged from 18% to 37% in the US and from 28% to 54% in the EU, the authors concluded that the gains were significantly higher than the resulting fines. They therefore recommended that both the US and the EU raise fines substantially.

If deterrence could be achieved by fining alone, this would be the best solution for cartel enforcement: fines can be increased at no cost compared with increases in the probability of detection. However, the deterrent effect of fines is limited due to a number of considerations. Firstly, there are limits to what a firm can pay and to what sound policy dictates that it should be made to pay. As Jenny (2010) points out, a very heavy fine might be beyond the ability of a company to pay and thus may push it into bankruptcy and cause it to exit in the market permanently. The market might then become less competitive than it would have been if the company had been punished but allowed to survive. Consequently, consumers might pay higher prices, receive poorer service, or benefit from less innovation. Indeed, Veljanovski (2012), using his database of 50 firms of the 168 firms prosecuted under 2006 Penalty Guidelines, estimates that 28% of them were fined in excess of their annual sales. This suggests that some fines may already have been excessive.

Secondly, increasing the severity of sanctions might counter-productively impose costs upon consumers in the form of higher prices as firms pass on increased monitoring and compliance expenditures (Ginsburg, Wright, 2010). The European Parliament identified yet another reason to avoid relying too heavily on fines, stating that the use of ever higher fines as the sole instrument for sanctioning competition law violations may be too blunt, not least with a view to potential job losses as a result of the inability to pay⁹. Thus, it is possible for a fine to be optimal for the purpose of achieving deterrence, but not optimal for preserving competition or promoting other policy objectives.

Ginsburg and Wright point out that, taking into consideration the data available, there is no indication that increasing fines against firms will enhance deterrence. Therefore,

⁹ European Parliament Resolution of 9 March 2010 on the Report on Competition Policy 2008. European Parliament, Procedure file 2009/2173(INI).

they propose to reform antitrust sanctions by both shifting the emphasis on sanctions against corporations to those directed at individuals and, included as an alternative sanction, debarment of individuals from the positions that enable them to violate competition laws or allow subordinates to do so. The two main aspects of their proposal are the overall level of deterrence and the combination, instead of the level, of sanctions (Ginsburg, Wright, 2010).

Motta (2007) notes that cartel fines have probably reached a level such that it may make sense to increase deterrence through other means: promote private actions for damages; introduce administrative fines and director disqualification for individuals, so that a manager's incentive could be more aligned with antitrust laws; promote the adoption by firms of antitrust compliance programs and of codes of conduct; implement criminal penalties for executives found guilty of collusive agreements. The 2007 survey of the UK businesses yielded the results that attest to the deterrent power of imprisonment. When asked to rank the factors that motivate compliance with the UK competition law, the companies rated criminal penalties higher than any other type of sanction. The other factors that the responding companies noted as motivated compliance were, in order: (2) disqualification of directors; (3) adverse publicity; (4) fines; and (5) private damages actions. Thus, the study suggests that the competition regimes that feature imprisonment as a potential sanction are highly effective at achieving deterrence (Office of Fair Trading, 2007).

Leniency policy

As noted above, increasing fines is not the only route to foster cartel deterrence. The expected cost of cartel activities may be enlarged by introducing the enforcement instruments that make the probability of cartel detection more likely (i.e. increase p), making shorter the period of investigation of the infringement and freeing resources for other important tasks. In this sense, the combination of leniency programs and direct settlement procedures can be very effective.

Leniency programs tend to deter anticompetitive behavior by increasing the probability of detection because such policy increases the risk of cartel activity, encouraging cartel participants to provide evidence against the other cartelists. Since cartels are secret by definition, *“the greatest challenge in the fight against hard-core cartels is to penetrate their cloak of secrecy and counter the increasingly sophisticated means at the companies' disposal to conceal collusive behavior”*¹⁰. The leniency policy¹¹ is designed

¹⁰ Commission adopts new leniency policy for companies which give information on cartels. IP/02/247 13/02/2002.

¹¹ Leniency could mean any reduction in the penalty compared to what would be otherwise imposed if the cartel was detected: smaller fine, shorter sentence, less restrictive order, or complete amnesty. Leniency programs are based on particular conditions which must be achieved and respected in order to qualify for such treatment.

so as to encourage a cartel member to confess and implicate its co-conspirators with a direct evidence of their illegal activity.

Leniency programs tend to deter anticompetitive behavior by increasing the probability of detection because such policy increases the risk of cartel activity, encouraging cartel participants to provide evidence against the other cartelists and seeding distrust and suspicion among the cartel members¹². There may be internal stability problems in cartels, because they require involvement of several parties and hence depend on the alignment of their incentives. While it is in the cartel members' joint best interest to adhere to the cartel agreement, this may not be reflected in their unilateral incentives. Each member of a cartel faces a conflict of interests when agreeing to increase its prices: by producing more output than it has agreed to produce, a cartel member can increase its share of the cartel's profits. Hence, there is a built-in incentive for each cartel member to cheat. The concept of inherent instability of cartels can be used to achieve deterrence through well designed leniency programs.¹³

The European Commission first introduced its leniency program in 1996¹⁴ and revised it twice, in February 2002¹⁵ and in December 2006¹⁶, when the existing leniency programs were changed as to guarantee to the first – and only the first – business or

individual to cooperate with competition authorities in collusion prosecution, complete amnesty or immunity from sanctions for its conduct.

TABLE 4. Cartel cases¹⁷ decided by the European Commission since 1990

Period	Number of cartels	% total
1990–1994	10	9.3
1995–1999	10	9.3
2000–2004	30	27.1
2005–2009	33	30.5
2010–2014	25	23.8
Total	108	100.0

Source: calculated by the author using data from www.europa.eu.int/competition/cartels/statistics.

The data presented in Table 4 and Figure 2 prove that the leniency policy has been extremely effective in making the detection of cartels more probable and the prosecution more frequent: the number of decisions in cartel cases increased three times. More than 80% of cartels since 1990 have been detected, prosecuted, and fined in the period 2000–2014.

¹² Leniency literature started with the work of Motta, M. and Polo, M. (2003). Leniency Programs and Cartel Prosecution. *International Journal of Industrial Organization*, Vol. 21, pp. 347–79; Rey, P. (2003). Towards a Theory of Competition Policy. In: *Advances in Economics and Econometrics: Theory and Applications – Eighth World Congress*; Spagnolo, G. (2000). Optimal Leniency Programs. Milano: Fondazione Eni Enrico Mattei Note di Lavoro 42/2000 and surveyed in Spagnolo (2008) *Leniency and Whistleblowers in Antitrust in Buccirossi P. (Ed.). Handbook of Antitrust Economics*, MIT Press, Cambridge.

¹³ More about the concept of inherent instability of cartels and its reflection in leniency policy, see in Klimašauskienė, Giedraitis (2011).

¹⁴ Commission Notice on the non-imposition or reduction of fines in cartel cases. OJ C 207, 18.07.1996.

¹⁵ Commission Notice on the non-imposition or reduction of fines in cartel cases. OJ C 45, 19.02.2002, p. 3–5.

¹⁶ Commission Notice on Immunity from fines and reduction of fines in cartel cases. OJ C 298, 08.12.2006, p.17.

¹⁷ A cartel case is a single proceeding against various undertakings concerned and may involve more than one infringement. Only those cartel cases where a fine had been imposed were considered for the purpose of this table.

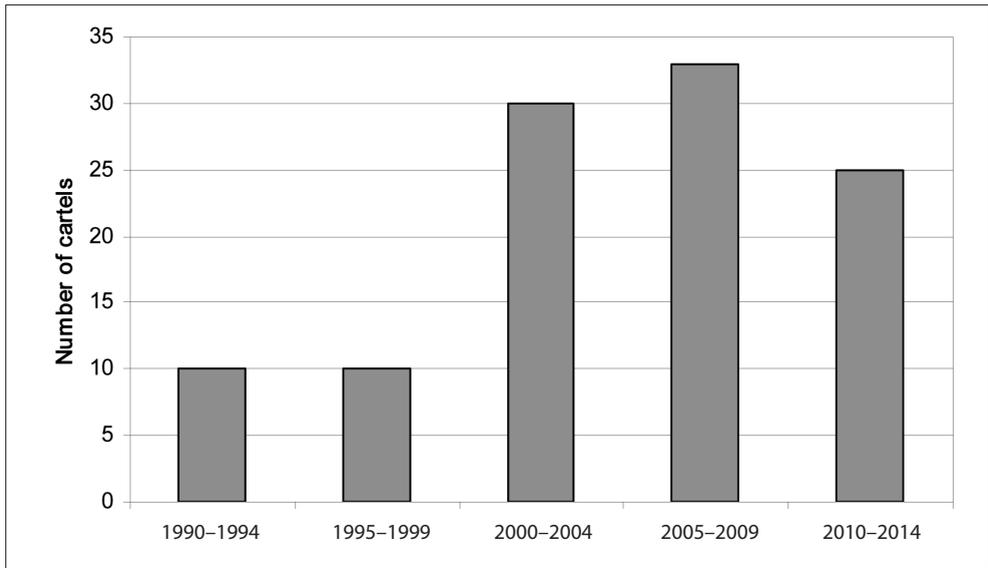


FIG. 2. Dynamics of cartel cases decided by the European Commission since 1990

Source: created by the author using data from www.europa.eu.int/competition/cartels/statistics.

The ultimate purpose of using leniency to fight cartels is to deter every company from continuing or engaging in such behavior. The economic literature provides evidence that leniency programs can be an effective tool to deter cartels. However, because of the inherently clandestine nature of cartels, the empirical analysis of the efficiency of leniency programs in deterring cartels is difficult. The problem is the lack of information regarding undetected cartels. The sample selection problem due to observing only the detected cartels may lead to biased estimates and misleading conclusions with regard to the impact of leniency programs on cartel deterrence (Agisilaou, 2013). Nevertheless, there are several empirical studies that attempt to measure the impact of leniency programs on cartel deterrence. For example, Spagnolo (2005) in a static model identifies conditions for an efficient setup of leniency programs, revealing that the strongest deterrence effect has a program which grants exclusive reductions of fines to the first confessor only. The analysis from Aubert et al. (2006) shows that reduced fines can have a positive impact on deterrence, but that programs offering rewards, especially if individuals are included, may have an even larger impact. Klein (2011) has empirically tested the hypothesis whether the competition intensity increases due to implementation of an effective leniency program, using as a measure of competition intensity the price-cost margin. He shows that leniency programs have a robust and throughout negative impact on the profit margins of firms, thus proving a positive impact on the competitive environment at the industry level.

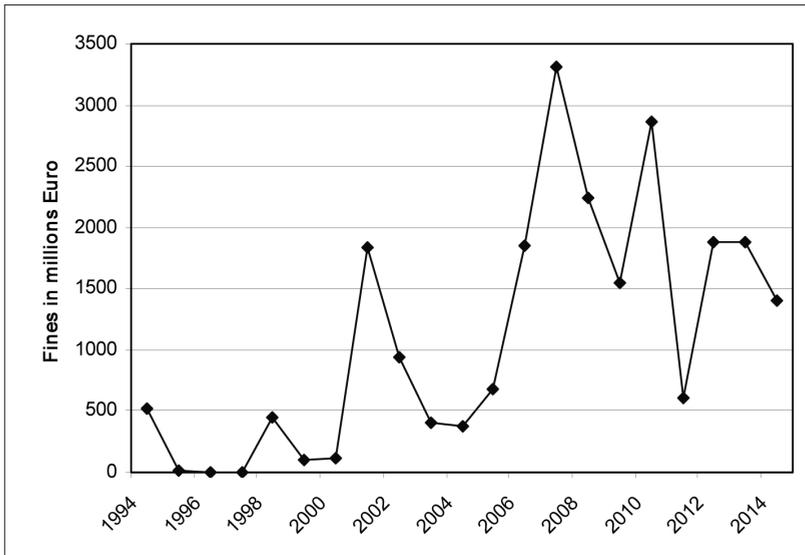


FIG 3. Dynamics of cartel cases decided by the European Commission since 1995

Source: created by the author using data from www.europa.eu.int/competition/cartels/statistics.

Miller (2009) develops a dynamic model of cartel behavior that provides predictions and moment conditions regarding the temporal distribution of the number of convicted cartels. The theoretical model predicts that the number of detected cartels increases immediately after the adoption of the leniency program (because of a higher rate of detection) and decreases in the long run (because of a lower rate of cartel formation). These effects are subsequently used to empirically identify the impact of the amended US corporate leniency program of 1993 on detection and deterrence capabilities. The author applies the model to the set of convicted US cartels over the period 1985–2005. The econometric results are consistent with the theoretical predictions suggesting that the number of cartels detected increases immediately following leniency introduction and then falls below the initial levels. Thus, Miller concludes that the amended US corporate leniency program of 1993 enhances both the deterrence and detection of cartels.

We tested the predictions of this model analyzing statistical data on cartels decided by the European Commission over the period 1995–2012 (Fig. 3). As we can see, the number of cartel discoveries significantly increases and then drops around the dates of introduction of 1996 leniency policy and its revisions in 2002 and 2006. Such a pattern is consistent with intensified cartel detection and improved deterrence.

The adoption of the leniency policy around the world was considered as the most significant development in cartel enforcement. However, the attractiveness of the leniency policy has caused a flood of leniency applications and created an expanding backlog of

cartel cases that would need to be dealt soon in order to achieve the timely and effective cartel enforcement. A few months after taking office, Commissioner Neelie Kroes warned in her ‘first hundred days’ inaugural speech that the Commission “*risks becoming the victim of its own cartel-busting success*”¹⁸. Since the entry into force of the 2002 Leniency Regime, the Commission has received more than 100 leniency applications. To face this administrative overload, Neelie Kroes proposed an internal reorganization promoting a “*simplified handling of cases*” and alluded to a direct settlement procedure that would use enforcement resources more efficiently and effectively.

Direct settlement procedure

Competition authorities can formally dispose of a cartel investigation through a settlement or plea bargaining agreement in which the defendant typically admits a competition law violation, agrees to cooperate with the investigation and waives certain procedural rights, sometimes including the right to appeal, in return for a reduced sanction. Without a settlement option, prosecuting cartels can take many more years, as the competition authority must go through a full procedure and resolution of the case. What is more, the appeal process may be engaged, requiring additional time and resources. For example, after discovery of an international cartel fixing the price of lysine, a widely-used additive in animal feed, it took almost 10 years after a plea agreement had ended the investigation in one jurisdiction before all appeals in the same case were finally exhausted in another jurisdiction (OECD, 2008). Ascione and Motta (2008) argue that the leniency policy, while successful in triggering evidence by cartel participants and thus in determining the collapse of several cartels, has not reduced considerably the length of the cartel proceedings: even the relatively “quick” cartel decisions taken in 2006–2007 rarely lasted less than three years. In their opinion, the Commission’s scarce resources were clearly occupied for too long with cartel cases, and settlements in cartel cases could allow speeding up the prosecution of cartels.

The rationale behind the introduction of an expedited settlement procedure lays on the premise that handling more cases with the same resources leads to a higher productivity in terms of decision delivery, hence ensuring a timely and effective punishment and more chances of discovering a cartel (Scordamaglia, 2009). This ultimately leads to increasing overall deterrence by increasing the probability of cartel detection: the more decisions identifying cartel infringements, the higher the deterrence effect, because more cartels in many sectors or concerning many products in the same sector can be scrutinized at the same time.

¹⁸ Commissioner Neelie Kroes Speech/05/205, ‘The First Hundred Days’, 40th Anniversary of the Studienvereinigung Kartellrecht 1965–2005, International Forum on European Competition Law, Brussels, 7 April 2005.

In accordance with the goal of deterrence and to expedite the resolution of violations charges, in June 2008, the European Commission introduced a procedure of direct settlement for cartels.¹⁹ Since then, 13 settlement decisions have been taken to date, with fines totaling almost €4 billion²⁰, i.e. half of the cartel cases during this period have resulted in settlements. The objective of the Commission when introducing the system was to increase efficiency. As Laina and Laurinen (2013) point out, the experience gained until now confirms fully that this objective has been achieved and that both the Commission as well as the companies have equally benefited from efficiency gains. Lessons are being drawn from these experiences, which may allow the further streamlining of the settlement process.

The settlement procedure allows the Commission to apply a simplified procedure to suitable cases and thereby reduce the length of the investigation. When parties are convinced of the strength of the Commission's case in view of the evidence gathered during the investigation and of their own internal audit, they may be ready to admit their participation in a cartel and accept their liability for it. This is good for consumers and for taxpayers as it reduces costs; good for antitrust enforcement as it frees up resources to tackle other suspected cases; and good for the companies themselves that benefit from quicker decisions and a 10% reduction in fines.²¹ Overall, this goal is based on the theory that the more efficient competition authority will reinforce deterrence and thereby promote compliance with antitrust laws.

Conclusions

Considering the harmful effects of cartels on society and economy, the effectiveness of competition policy regime depends on its ability not only to detect and punish, but also to deter such anticompetitive practices. Applying the classical deterrence theory based on the model of criminal activity, we identify the main factors that are likely to affect the degree of deterrence of anticompetitive behavior: adequate sanctions and the probability of detection. In this paper, we focus on leniency programs and direct settlement procedure, both as instruments to promote the probability of cartel detection, and on the level of fines.

Fines and other sanctions directly reduce the incentives to commit an infringement. The European Commission's fines are designed to induce general and specific deterrence,

¹⁹ Commission Notice on the conduct of settlement procedures in view of the adoption of Decisions pursuant to Article 7 and Article 23 of Council Regulation (EC) No 1/2003 in cartel cases (Text with EEA relevance), Official Journal C 167, 2.7.2008, p. 1–6.

²⁰ Joaquin Almunia speech: Fighting against cartels: A priority for the present and for the future. European Commission – SPEECH/14/281 03/04/2014.

²¹ Antitrust: Commission fines producers of water management products € 13 million in sixth cartel settlement decision, Antitrust: Commission Adopts First Cartel Settlement Decision (May 19, 2010). Official Journal: 2008 (L 171) 3.

and they have been set very high to achieve this goal. However, the deterrent effect of fines is limited and must be increased through other sanctioning means.

Leniency programs tend to deter anticompetitive behavior by increasing the probability of detection since they target the stability of cartel arrangements, reducing the costs of deviation from the cartel agreement, and encouraging cartel participants to provide evidence against the other cartelists. Empirical evidence and our analysis of data on cartels decided by the European commission over the period 1995–2012 support this notion, showing that the number of cartel discoveries significantly increases and then drops around the dates of the introduction of leniency policy and its revisions. Such a pattern is consistent with an intensified cartel detection and improved deterrence.

Direct settlement procedures increase the probability of cartel detection as well, making the period of investigation of the infringement shorter and saving resources for other important tasks.

During the last two decades, the European competition authorities have increased their efforts against the anticompetitive cartel behavior with the objective to achieve a better deterrence by numerous amendments of the European competition law, such as extensions of the fine spectrum or leniency programs or introducing a direct settlement procedure. Nevertheless, the effectiveness of the current enforcement system is increasingly discussed in the economic literature with respect to improving cartel deterrence through enhanced detection and new sanctioning regimes against offenders.

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